

J. Ted Mackereth, Ph.D.

PhD in Astrophysics with focus on statistics, machine learning and high performance computational methods. Natural problem solver and generalist. 3 years experience in post-doctoral roles, thrives in fast-paced, deadline-driven environments, seeking new challenges and growth in data and industry.

EXPERIENCE

Banting, CITA and Dunlap Postdoctoral Fellow

📅 2020 - Present

📍 *Canadian Institute for Theoretical Astrophysics, University of Toronto, Canada*

- Nationally funded independent researcher in galactic astrophysics overseeing a broad range of solo and collaborative projects using large scale **hydrodynamical simulations** and **multi-dimensional observational data** sets, applying **Bayesian modelling** and **machine learning** techniques

Galactic Archaeology Postdoctoral Fellow

📅 2019 - 2020

📍 *School of Astronomy & Astrophysics, University of Birmingham, UK*

- Providing expertise on galaxy evolution to a stellar astrophysics group
- Applying **Fourier Analysis**, **Gaussian Process models**, **Hierarchical Bayesian modelling** to **time-series data** using **PyMC3**, **Stan**, **Keras**

PROJECTS

Artificial Neural Networks for age-dating 400,000 stars

- Developed pipelines and Bayesian CNN models for fast and reliable prediction of ages in 400,000 stars from high-dimensional spectroscopic data

Advanced Bayesian models of the structure of the Milky Way

- Applied inhomogeneous spatial Poisson point process models to make detailed maps of the structure of our Galaxy from incomplete and noisy data

Time-series data analysis of stellar oscillations

- Performed Fourier analyses of time-series data to interrogate the internal structure and properties of stars to make 4x improvement in age measurement precision

Analysing the largest simulations of our Universe

- Derived important predictions for the origin of our Galaxy by leveraging the largest hydrodynamics simulations of our Universe

EDUCATION

PhD, Astrophysics

📅 2015 - 2019

📍 *Astrophysics Research Institute, Liverpool John Moores University, UK*

- Thesis entitled 'Unveiling the History and Nature of the Milky Way using Galactic Surveys and Numerical Simulations'
- Developed new algorithm for determining orbits of stars in the Milky Way
- Part time lab demonstrator and distance learning course instructor

MPhys, Astrophysics

📅 2011 - 2015

📍 *University of Liverpool, UK*

- Graduated 1st Class w/ Honours
- Courses included statistics, computational physics, dynamics

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LANGUAGES

PROFICIENT

python SQL

FAMILIAR

R Julia C/C++ MATLAB

TOOLS

Numpy Scipy scikit-learn

PyTorch Pyro Keras PyMC

TensorFlow BigQuery

plotly/Dash Matplotlib

Figma Google Cloud

SKILLS

Statistics AI/ML

Data Visualisation

Programming Modelling

Communication Mentoring

Leadership Critical Thinking

Problem Solving

Project Management

AWARDS & HONOURS

Thesis Prize

2019 LJMU Faculty of Engineering Thesis Prize

Banting Postdoctoral Fellowship

One of Canada's most competitive postdoctoral awards

James Webb Space Telescope

Lead a proposal which was awarded some of the first observing time

INTERESTS

Design Architecture Hiking

Open Science/Data Art